Epidermal desquamation in Thiel-embalmed cadavers

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Epidermal desquamation in Thiel-embalmed cadavers: histologic study

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Introduction

Fingerprint comparison is often used to identify dead. Direct comparison of dermal and epidermal fingerprints can be vital to the identification of bodies that have been in water for long periods of time and epidermal skin layer is lost.

Epidermal desquamation occurs during the fixation of bodies in Thiel embalming fluid. The desquamation process therefore provides an opportunity to compare dermal and epidermal fingerprints from the same individual, however current literature is vague on the histology of the detached skin layer in Thiel-embalmed bodies.

In order to understand the desquamation process that exposes dermal fingerprints, it is important to confirm at which histological level of the skin the desquamation occurs. The desquamation that occurs as a result of the Thiel embalming process allows investigation to establish both where the separation of the skin layers occurs, but also at which point during exposure of the skin to a wet environment this separation might be expected to happen.

Aim

To establish a timeframe of epidermal desquamation and describe the histology of epidermal desquamation which occurs as a result of the Thiel embalming process.

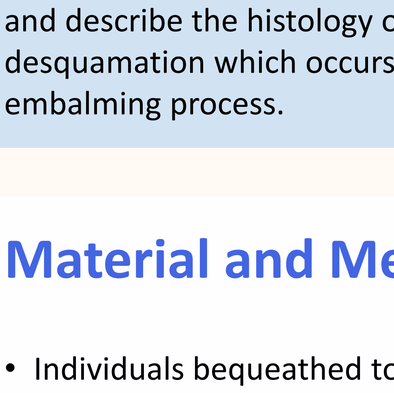
Material and Method

- Individuals bequeathed to CAHID (N = 8)

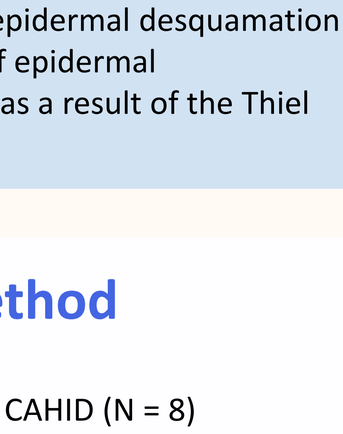
- Left thumb
- Biopsy skin punch (Ø 4mm)
- Hematoxylin-Eosin staining
- Optical light microscopy

- Sampled prior to embalming and then weekly for 4 to 6 weeks after the immersion into embalming tank

Individual	Sex	Age	Week of last sampling
1	M	98	4
2	F	91	4
3	F	90	4
4	F	84	4
5	F	75	4
6	F	81	6
7	F	77	6
8	M	62	4



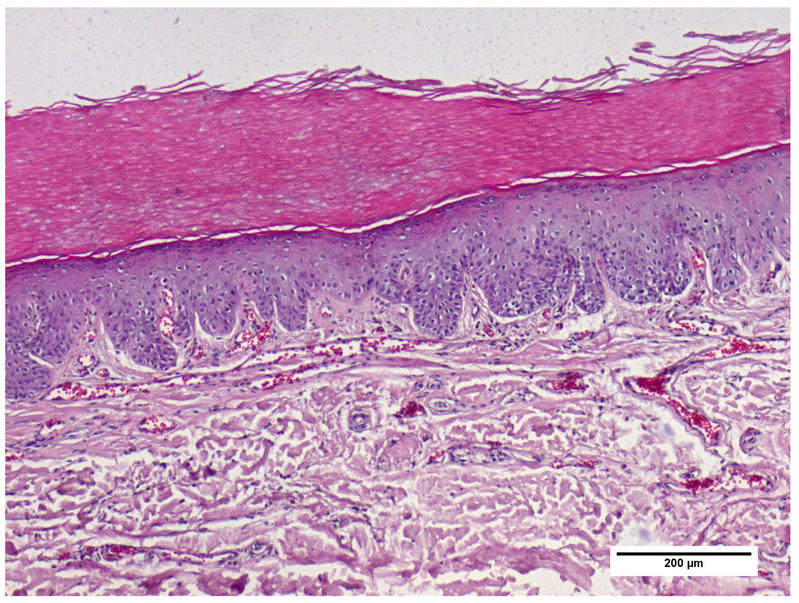
Biopsy skin punch



Binocular microscope

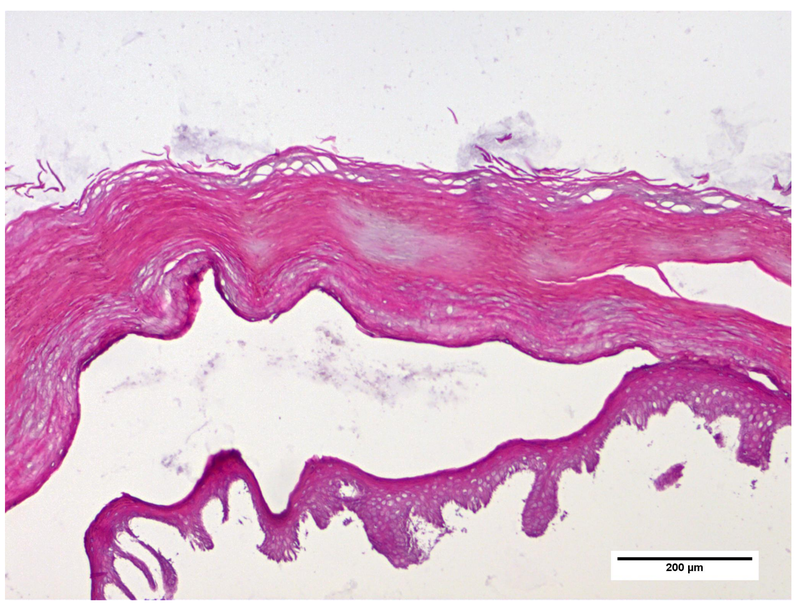
Results

The epidermal skin layer became completely detached between the first and the sixth week after immersion into Thiel embalming fluid.

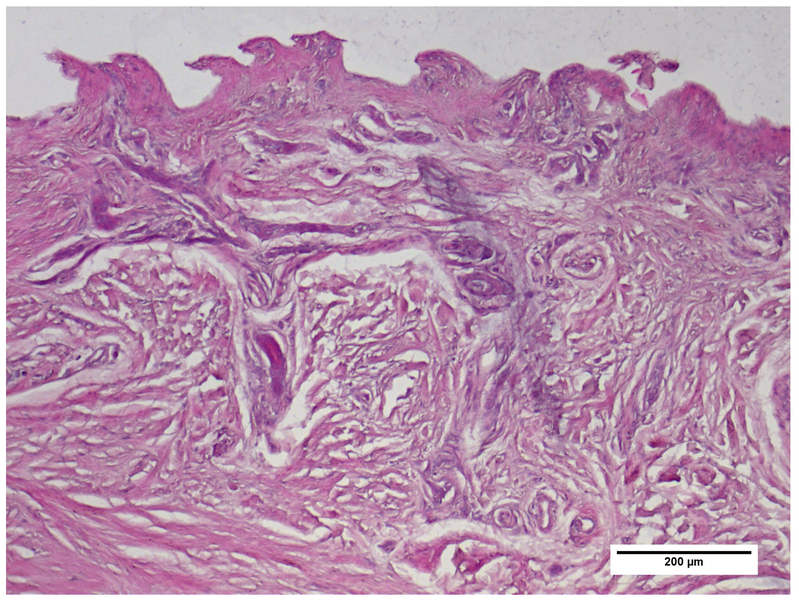


Individual 4 pre-embalming: epidermis attached to dermis

Individual 2 week 3 in Thiel fluid: detaching of epidermis from dermis



Individual 5 week 1 in Thiel fluid: detached epidermis



Individual 1 week 1 in Thiel fluid: exposed dermis

Results

Epidermal desquamation was completed by week four of immersion in Thiel embalming fluid in six sampled individuals.

Surface skin layer observed in histologic section.
E = epidermis, D = dermis

Individual	Pre-embalming	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6
1	E	D	D	D	D	-	-
2	E	E	D	E	D	-	-
3	E	D	D	D	D	-	-
4	E	E	E	D	D	-	-
5	E	D	D	D	D	-	-
6	E	E	E	E	E	E	E
7	E	E	D	E	E	D	D
8	E	E	E	E	D	-	-

Conclusions

By week four of the immersion in the embalming fluid, desquamation was completed in a majority of individuals. For three samples, desquamation occurred during week one of the immersion in embalming fluid. More samples are required to study temporal variations in epidermal desquamation caused by Thiel embalming process.

As epidermal desquamation during embalming process exposes the dermal skin layer, Thiel-embalmed cadavers are suggested as suitable models for further research of dermal-epidermal fingerprint comparison.

Dermal fingerprints can be collected from Thiel-embalmed bodies after week six of the immersion in embalming fluid.

Epidermal fingerprint

Dermal fingerprint

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